

R E P O R T R E S U M E S

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PARKING FACILITY PROJECTIONS BASED ON THE 1968 STUDENT
PARKING SURVEY.

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REGULATIONS,

RESPONSES FROM 1,309 STUDENTS AND 121 CAMPUS EMPLOYEES
AT CUYAHOGA COMMUNITY COLLEGE WERE USED TO PROJECT
REQUIREMENTS FOR PARKING FACILITIES AT THE INSTITUTION BY
1971. STUDENTS INDICATED WHETHER OR NOT THEY CURRENTLY DROVE
TO SCHOOL AND, IF NOT, IF THEY WOULD INTEND TO DRIVE IF
PARKING FACILITIES WERE PROVIDED AT A NOMINAL FEE. FINDINGS
SHOWED THAT (1) 70 PERCENT OF THE STUDENTS DROVE TO SCHOOL,
(2) 69 PERCENT OF THE CAMPUS EMPLOYEES DROVE TO SCHOOL, (3)
61 PERCENT NEVER LEFT AND RETURNED TO THE CAMPUS BY CAR THE
SAME DAY, (4) 30 PERCENT SOMETIMES LEFT AND RETURNED BY CAR
THE SAME DAY, (5) 3 PERCENT ALWAYS LEFT AND RETURNED BY CAR
THE SAME DAY, (6) 63 PERCENT PARKED IN PRIVATE OR MUNICIPAL
LOTS, (7) 11 PERCENT WERE NOT WILLING TO DRIVE AT ALL, AND
(8) 85 PERCENT WOULD DRIVE TO SCHOOL EACH DAY IF PARKING
FACILITIES WERE PROVIDED AT A NOMINAL FEE. IT WAS ESTIMATED
THAT 7,440 PARKING SPACES WERE REQUIRED FOR STUDENTS WITH
10,248 SPACES BEING NEEDED BY 1971, AND THAT 207 SPACES WERE
NEEDED FOR CAMPUS EMPLOYEES WITH 261 SPACES NEEDED BY 1971.
BY USE OF FORMULAS BASED ON THE EXPECTED AMOUNT OF TIME SPENT
ON CAMPUS BY STUDENTS AND CAMPUS EMPLOYEES, SPACE
REQUIREMENTS FOR PARKING FACILITIES WERE TABULATED WITH THE
RESULTS INDICATING CURRENT PARKING REQUIREMENTS OF 2,780
SPACES AND THE PROJECTED FULL UTILIZATION DEMAND SLIGHTLY
EXCEEDING 3,800 SPACES FOR 6,000 FTE DAY STUDENTS. (DG)

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I

Introduction

The purpose of this report is to present the findings of the recent student parking survey, conducted at the Metropolitan Campus of Cuyahoga Community College for the purpose of planning the parking facilities required for this institution by 1971, when its new campus is expected to be fully occupied with an enrollment of 6,000 FTE day students. The study was taken by the Office of Planning and Development during the registration period for the Spring semester of 1968. Students registering at the current downtown facilities were asked, by means of a questionnaire (see appendix for sample), to indicate if they currently drove to school and, if not, if they would intend to drive if parking facilities were provided at a nominal fee. The needs for parking facilities for faculty, administrative and nonacademic employees at the Metropolitan Campus were taken from a survey of housing and transportation requirements of this group conducted in the winter of 1967. The findings from these two questionnaires were used to project requirements for parking at the new Metropolitan Campus.

This study was not intended to analyze all the methods, public or private, of transportation to school used by faculty, staff and students. It only concerns itself with those persons who currently drive and park their automobiles somewhere near the present temporary campus facilities and those who might drive if parking were more readily available or less costly as predictive factors for establishing the future parking requirements when the new campus is fully occupied, expected to be in 1971-72.

Sample Design of Student Parking Survey

To obtain a valid sample of the large enrollment of more than 8,000 students expected at the Metropolitan Campus during the current semester, the students were divided into two groups - regular "in person" registrants and mail registrants. The "in person" group was sampled at the time of registration, and the students registering by mail received the questionnaire as part of their registration materials.

The "in person" regular registration at the Metropolitan Campus was handled on a sample basis with one out of every four registrants given a questionnaire to complete. A total of 1,225 completed forms were returned. All mail registrants received a questionnaire to insure as large a response rate as possible. A total of 84 out of approximately 1,245 returned completed forms.

Actual total responses from both groups included 1,309 out of a total Metropolitan Campus 14th day head count of 8,712¹ - or 15.02 per cent of total enrollment.

The questionnaire was not distributed until December 21, 1967 and, therefore, missed approximately 500 early registrants -- Spring registration ran from December 1, 1967 to January 17, 1968. As this represents approximately 5.7 per cent of the total Metropolitan Campus enrollment, or 75 more respondents, it is not considered large enough to influence reliability (the percentage of responses would have been 15.89 as compared with 15.02).

The Chi-square value when comparing Fall, 1967 to the sample of Spring, 1968 is equal to 0.8156. For four degrees of freedom the probability is greater than 90 per cent that the difference arises from sampling variation. The sample can, therefore, be considered valid

¹The "official total day and night enrollment" at the Metropolitan Campus has been established as 8,720 -- the sample was actually 15.01 per cent out of the population.

and significant at the .90 level of confidence. In other words, nine times out of ten, any observed characteristic of the sample elements will be similar to the characteristics of the population from which they were taken.

Reliability of the sample was tested by comparing expected course loads for Spring, 1968 against actual hours carried for the Fall, 1967 semester. Chart 1 presents the credit hours as observed in the sample just completed. As of the Fall, 1967 semester, the following was the credit hour distribution of Metropolitan Campus students:

12 or more hours	36.99%
7 to 11 hours	9.62
4 to 6 hours	17.73
0 to 3 hours	35.66
	<u>100.00%</u>

Faculty, Administrative and Nonacademic Personnel
"Housing and Transportation Questionnaire"

During the months of January and February, 1968, the Office of Special Assistance issued a questionnaire to faculty, administrative and nonacademic employees of Cuyahoga Community College. A total of 495 questionnaires were sent to all employees of the college. Of these, approximately 250 were sent to Metropolitan Campus employees. Since only the employees working at the Metropolitan Campus will be of concern here, only those returns will be discussed. A total of 121 responses were received from Metropolitan Campus employees -- or 48.4 per cent. Since a complete census was performed, this response rate is quite enough to use as indicative of the population. Although many areas of housing and transportation were covered in this questionnaire, only that section dealing with automobile transportation was of interest here. Approximately 68.6 per cent of the faculty, administrative and nonacademic employees of the Metropolitan Campus indicated that, at one time or

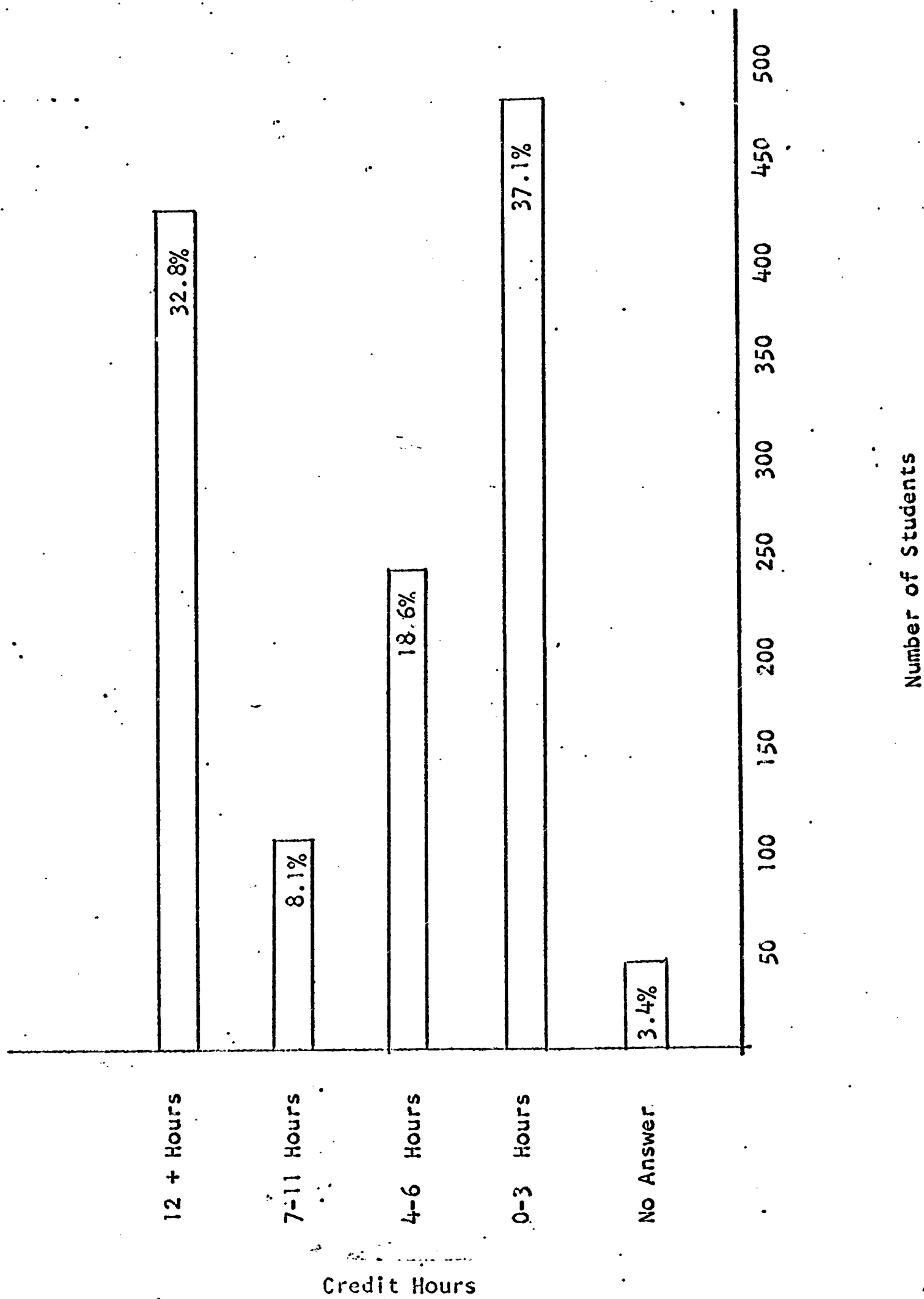


Chart 1. NUMBER OF STUDENTS SAMPLED BY CREDIT HOURS CURRENTLY CARRIED
N = 1309

another, they drove to work. This was taken into account when calculation for expected parking requirements were made. In establishing expected driving rates 68.6 per cent was considered the working ratio of faculty, administrative and nonacademic personnel.

II

Driving Practices of Currently Enrolled Students

The major goal of this study was to determine how many students currently drive to school and how many others could be expected to drive if parking facilities could be provided at the Metropolitan Campus.

In some instances, "in person" and mail registration are shown separately, but it is not considered a significant separation of data for planning purposes. This is mainly due to sampling design and ease of tabulating data.

Of the students answering the questionnaire, 69.5 per cent indicated they drove to school and 29.9 per cent said they did not -- 0.6 per cent, or 8 students, did not answer the question. A larger percentage of mail registrants, all carrying part-time course loads, drive to school than regular "in person" registrants (38.1 per cent and 68.3 per cent respectively). Table 1, lists the students who drive and don't drive classified by mail and "in person" registration.

Students currently driving to school were asked if they ever left the campus in their cars and returned later. The responses to the question is listed below (no distinction is made between "in person" and mail respondents since the great majority of mail respondents did not answer this question):

	Count	Per Cent
Never leave campus by car	553	61.3%
Sometimes leave campus by car	278	30.6
Always leave campus by car	23	2.5
No answer	51	5.6
	910	100.0%

While close to one-third of the present drivers currently leave the campus in their cars and return later, it must be realized that at present most students must pay a second parking fee when they return to park their

TABLE 1
RESPONDENT'S "DRIVING TO SCHOOL" PREFERENCE

Type of Respondent	Drive To School		Don't Drive To School		No Answer		Total	
	Count	Per Cent	Count	Per Cent	Count	Per Cent	Count	Per Cent
Regular, in Person, Registration	836	91.9	381	97.4	8	100.0	1,225	93.6
Per Cent	68.3		31.2		0.5		100.0	
Mail Registration	74	8.1	10	2.6	---	---	84	6.4
Per Cent	88.1		11.9		---		100.0	
Total	910	100.0	391	100.0	8	100.0	1,309	100.0
Per Cent	69.5		29.9		0.6		100.0	

cars. What restraint this is having on current leaving habits is not known. The major factor is, almost one-third of the current drivers deem it important enough to pay the second fee for parking their cars after leaving campus rather than using public transportation.

Table 2 is a comparison of those students who do not drive now and what their future plans for driving would be if parking facilities were provided. Only those not currently driving are included for future plans. Of the 391 students not presently driving to school, more than half (53.2 per cent) indicated they would drive if parking was available at a nominal fee. The mail and "in person" percentage responses were very close on this question. Table 3 and 4 shows that a full 85.4 per cent (1,118 out of 1,309) of the students answering the questionnaire either drive to school now or would drive if parking was provided.

The data presented in Table 5 depicts how the respondents answered both current driving habits and willingness to drive if parking facilities were available. It is significant to note that only 11.3 per cent of the respondents indicated no willingness to drive to school with or without parking facilities -- another 3.3 per cent failed to answer the question. Among the night students not now driving to school there appears to be a lesser tendency to consider future driving than day students who do not drive.

How students who are currently driving usually parked their cars in relation to when they attended classes (day, night or day and night) is outlined in Table 6. There were only two choices allowed in this question since only municipal or public lots and "on-the-street" parking are available to Metropolitan Campus students. Only students who identified themselves as current drivers are considered here. Out of the 69.5 per cent driving (910 out of 1,309) the great majority, as expected,

TABLE 2

THOSE STUDENTS NOT NOW DRIVING WHO SAID THEY WOULD OR WOULD NOT
DRIVE IF PARKING WAS PROVIDED AT A NOMINAL FEE

Type of Respondent	Do Not Drive Now Count Per Cent	If Parking Was Provided at a Nominal Fee			
		Would Drive		Would Not Drive	
		Count	Per Cent	Count	Per Cent
Regular, In Person, Registration	381 100.0	203	53.3	178	46.7
Mail Registration	10 100.0	5	50.0	5	50.0
Total	391 100.0	208	53.2	183	46.8

TABLE 3

STUDENTS DRIVING NOW AND THOSE WHO WOULD DRIVE
IF PARKING WAS PROVIDED

Type of Respondent	Drive Now		Would Drive		Total	
	Count	Per Cent	Count	Per Cent	Count	Per Cent
Regular, In Person, Registration	836	80.5	203	19.5	1,039	100.0
Mail Registration	74	93.7	5	6.3	79	100.0
Total	910	81.4	208	18.6	1,118	100.0

TABLE 4
STUDENTS WHO DRIVE TO SCHOOL NOW OR WOULD DRIVE TO SCHOOL
IF PARKING WAS PROVIDED AT A NOMINAL FEE

Type of Respondent	Drive to School Now or Would if Parking Was Provided at a Nominal Fee		Total Students Questioned	
	Count	Per Cent	Count	Per Cent
Regular, In Person, Registration	1,039	84.8	1,125	100.0
Mail Registration	79	94.0	84	100.0
Total	1,118	85.4	1,309	100.0

NOTE: 1,296 respondents were included with 178 answering "Would not drive if parking was provided," (1,118 + 178 = 1,296) - 13 respondents did not answer one or both questions. Those students who drive to school now can be assumed to continue driving if parking is provided at a nominal fee.

TABLE 5

STUDENT'S CURRENT DRIVING PREFERENCE AND FUTURE
WILLINGNESS TO DRIVE TO SCHOOL IF PARKING
FACILITIES WERE PROVIDED

		Responses	
		Count	Per Cent
Day Only Students	Currently Drive	282	21.5
	Do not drive now but would drive if parking was provided	115	8.8
	Do not drive now and would not drive if parking was provided	62	4.7
	No answer	7	0.5
Night Only Students	Currently Drive	527	40.3
	Do not drive now but would drive if parking was provided	70	5.3
	Do not drive now and would not drive if parking was provided	86	6.6
	No answer	18	1.4
Day & Night Students	Currently Drive	101	7.7
	Do not drive now but would drive if parking was provided	23	1.8
	Do not drive now and would not drive if parking was provided	--	--
	No answer	10	0.8
(NO ANSWER)		<u>8</u>	<u>0.6</u>
Total		1309	100.0

TABLE 6
CURRENTLY DRIVING STUDENT'S INDICATED
PARKING HABITS

Type of Respondent	Usually Park in Muni or Private Lot				Usually Park on Street				No Answer	Total	
	Day Classes Only	Night Classes Only	Day & Night Classes	No Answer	Day Classes Only	Night Classes Only	Day & Night Classes	No Answer			
Regular, In Person Registration	Count	204	269	68	2	64	159	32	1	37	836
	Per Cent	24.4	32.2	8.1	0.3	7.7	19.0	3.8	0.1	4.4	100.0
Mail Registration	Count	1	33	--	--	--	14	--	--	26*	74
	Per Cent	<u>1.4</u>	<u>44.6</u>	<u> </u>	<u> </u>	<u> </u>	<u>18.9</u>	<u> </u>	<u> </u>	<u>35.1</u>	<u> </u>
Total	Count	205	302	68	2	64	173	32	1	63	910
	Per Cent	22.5	33.2	7.5	0.3	7.0	19.0	3.5	0.1	6.9	100.0

*Includes one student who drives to school for day classes but did not indicate where usually parks. Listed in Table 6 as Day Driver.

	Count	Per Cent
Total Lot (Private or Muni)	577	63.14%
Total Street	270	29.7
No Answer	63	6.9
	910	100.0%

indicated they usually parked in either municipal or private lots (63.4 per cent).¹

Summary of Observed Driving Practices

The following major findings can be reported from the recent student parking survey:

1. Currently 69.5 per cent of the Metropolitan Campus students drive to school. Drivers by class attendance are as follows:

	<u>Count</u>	<u>Per Cent of Total Sample</u>
Day	282	21.5%
Night	527	40.3
Day & Night	101	7.7
Total Drivers	910	69.5%

2. Of those students currently driving to school, 63.4 per cent usually parking in private or municipal lots.
3. Only 11.3 per cent of the questioned students showed no willingness to drive at all. The class attendance of these students is as follows:

	<u>Count</u>	<u>Per Cent of Total Sample</u>
Day	62	4.7%
Night	86	6.6
Total Non-Drivers	148	11.3%

4. A total of 85.4 per cent indicated they either drive to school now or would drive if parking facilities were provided at a nominal fee. It can be assumed that of those now driving to school most will continue to drive even if no facilities are provided.

	<u>Count</u>	<u>Per Cent of Total Sample</u>
Day	397	30.3%
Night	597	45.6
Day & Night	124	9.5
Total Drivers	1,118	85.4%

1

In this case the mail registration responses seem less than significant since more than one-third of the drivers failed to answer the question. They do, however, show the same general tendencies as the "in person" registrants.

III

Projected Parking Requirements

This section has as its purpose to project the findings of the student parking survey to future parking needs at the new Metropolitan Campus of Cuyahoga Community College and to make use of data available from another study which dealt with the matter of housing and transportation of faculty, administrative and nonacademic employees of the college assigned to the Metropolitan Campus.

Student Parking Habits as Observed in the Sample Population of the Recent Parking Survey

It was found that a total of 910 respondents drove to school and another 208 indicated they would drive if parking facilities were provided. This accounts for 69.5 per cent and 15.9 per cent respectively (or a total of 85.4 per cent) of the students sampled. Using this as a guide and assuming that current drivers will continue to drive if parking facilities are available, later discussion will consider 85.4 per cent as the student driving ratio.

Based on the Spring, 1968 14th day head count of 8,712¹ enrollment at the Metropolitan Campus, there would be a total of 7,440 students requiring parking places. Table 7 shows projections from the sample for current enrollment and estimated "full-utilization" of approximately 12,000 total head count (or 6,000 full-time equivalent day students). If it is assumed that the ratios will hold true for day, night and day and night students when full-utilization of the new campus is reached, the following can be considered parking requirements for students at the new Metropolitan Campus at the time of complete utilization:

1

See footnote on page 2

TABLE 7

**PROJECTED STUDENTS WILLING TO DRIVE TO SCHOOL IF PARKING
FACILITIES WERE PROVIDED**

		Responses from Current Parking Survey	Observed Rates Projected on Current Enroll- ment Spring 1968	Observed Rates Projected to Full Utiliza- tion
Day Only	Drive	282	1875	2582
	Would Drive	115	766	1056
Night Only	Drive	527	3504	4827
	Would Drive	70	469	646
Day & Night	Drive	101	669	922
	Would Drive	23	157	215
Totals	Drive	<u>910</u>	<u>6048</u>	<u>8331</u>
	Would Drive	208	1392	1917
Population		N = 1,309	N = 8,712	N = ± 12,000

	<u>Spring 1968</u>	<u>Projected Full Utilization</u>
Do Drive	6048	8331
Would Drive	1392	1917
Total Drivers	<u>7440</u>	<u>10,248</u>

For purposes of projecting required parking spaces, 7,440 and 10,248 will be considered present and future drivers requiring parking at the new Metropolitan Campus from three to thirty hours per week.

Parking Requirements of Faculty,
Administrative and Nonacademic Employees

As of Fall, 1967, the following number of persons were employed at the Metropolitan Campus (also listed are "full-utilization" employment projections discussed below):

	<u>Current</u>	<u>Projected Full Utilization</u>
Full-time Equivalent (FTE) Teachers	202	281
Classified Staff	76	76
Administrative Staff	23	23
Total Faculty (FTE) and Staff	<u>301</u>	<u>380</u>

The current total full-time equivalent night and day student enrollment at the Metropolitan Campus is 4,311 as of the official 14th day head count. Projecting the current FTE student ratio on the expected FTE of 6,000 at full utilization, the required FTE teachers would be 281 based on the following ratio of 1:21.3 FTE teachers to FTE students:

$$\frac{202}{4311} = \frac{x}{6000}$$

It is assumed that the same members of administrative and nonacademic employees will be needed to staff the new campus as are currently on the payroll.

As indicated before, in the discussion of sample designs, faculty, administrative and nonacademic employees at the Metropolitan Campus show a driving rate of 68.6 per cent. By reducing the known and projected "full-utilization" employment figures by this rate the following

adjusted figures will represent employees requiring parking spaces:

	<u>Current</u>	<u>Full Utilization</u>
Full-time Equivalent Teachers	139	193
Classified Staff	52	52
Administrative Staff	16	16
Total Faculty and Staff	<u>207</u>	<u>261</u>

These figures will be considered present and future driver ratios for estimating parking space requirements.

Forecasting Parking Needs

Certain assumptions regarding the usage of parking facilities at the new campus must be made here. They are:

1. Parking facilities will be available from 8:00 A.M. to 10:00 P.M. - 14 hours each day.
2. Evening students will spend an average of four hours each day on campus. This is based on the fact that the largest percentage take between three and six credit hours.
3. Day students spend up to seven hours each day on campus.
4. Students attending classes both in the day and evening will spend the same amount of time each day on campus as evening only students - four hours each day. They will be grouped with evening only students for calculations.
5. Faculty members can be expected to average at least five hours each day on campus (based on the 25 hour per week "on duty" requirement).
6. Nonacademic staff can be expected to spend eight hours on the campus each day.
7. Administrative staff should have space available at all times - eight hours each day.

Maximum Requirements

Based on the assumptions listed above, the usage factors will be as follows:

- | | |
|--|------|
| 1. Evening only and Day and Evening Students | 4/14 |
| 2. Day only students | 7/14 |
| 3. Faculty | 5/14 |
| 4. Nonacademic Staff | 8/14 |
| 5. Administrative Staff | 8/14 |

These ratios reflect the expected time spent on campus each over the total hours parking available each day.

Two formulas were used to estimate the parking requirements:

$$1. \quad 4/14 \sum N + 7/14 \sum D = \text{Spaces required}$$

Where: $\sum N$ = Total evening only and day and evening drivers
 $\sum D$ = Total day only drivers

$$2. \quad 5/14 \sum T' + 8/14 \sum (C+A) = \text{Spaces required}$$

Where: $\sum T'$ = Total full-time equivalent teachers
 $\sum (C+A)$ = Total nonacademic plus administrative staff

The two formulas will be combined to produce a space requirement which will reflect combined student and faculty, administrative and nonacademic employees driving intentions.

Referring to the respective tables the figure to be used in calculations are:

	Current	Full Utilization
$\sum N$ =	4799	6610
$\sum D$ =	2641	3638
$\sum T'$ =	139	193
$\sum (C+A)$ =	52+16 = 68	52+16 = 68

Current parking requirements can be estimated at approximately 2,780 as follows:

$$\begin{aligned}
 X &= \frac{4(4799) + 7(2641)}{14} + \frac{5(139) + 8(68)}{14} \\
 &= \frac{37683}{14} + \frac{1239}{14} = \frac{38922}{14} \\
 &= 2780.1
 \end{aligned}$$

The maximum number of parking facilities required, based upon this data, can be estimated at approximately 3,800 as follows:

$$\begin{aligned}
 X &= \frac{4(6610) + 7(3638)}{14} + \frac{5(193) + 8(68)}{14} \\
 &= \frac{51906}{14} + \frac{1509}{14} = \frac{53415}{14} \\
 &= 3815.3
 \end{aligned}$$

The present driving patterns of students and faculty, administrative and nonacademic employees indicate that present demand for parking facilities approaches 2,800 spaces and projected full utilization demand slightly exceeds 3,800 spaces.

Minimum Requirements

If parking is provided only for that group of students who are currently represented by those who do actually drive to school, and not those who "might if parking was provided," using the technique described, it must be expected that 2,700 spaces would be needed to supply the need when the campus is fully utilized.

In planning parking facilities, it is recommended that a minimum of 2,800 spaces be provided with plans for gradual expansion to the full 3,800 spaces within a reasonable period of time.

Appendix I

Reproduction of Questionnaire used in Student Parking Study.

STUDENT PARKING SURVEY
CUYAHOGA COMMUNITY COLLEGE

DIRECTIONS: In able to assist us in planning for future parking facility requirements, please complete and return the following form. Place a check (✓) mark after the phrase which best relates to you.

- A. I am: Male () Female ()
- B. I am currently planning to enroll in () credit hours during the Spring semester.
- C. I will attend classes in the: Day () Night () Day and Night ()
- D. Do you drive a car to school? Yes () No ()
- E. If you don't drive now, would you if parking were provided at a nominal cost? Yes () No ()
- F. If you drive to school, how many passengers do you regularly carry? 0-1 () 2-3 () 4 or more ()
- G. I usually park my car: at a private lot or Muni lot () on the street ()
- H. My trip to school usually begins at: Home () Work () Other ()
- I. My destination when leaving campus is usually: Home () Work () Other ()
- J. Do you ever leave campus in your car and return later? Never () Sometimes () Always ()
- K. My car is a: Compact () Standard Size ()